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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,598	03/25/2004	Johannes Jacobus Matheus Baselmans	081468-0308899	5600

909 7590 06/01/2006

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EXAMINER

AKANBI, ISIAKA O

ART UNIT PAPER NUMBER

2877

DATE MAILED: 06/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/808,598

Applicant(s)

BASELMANS ET AL.

Examiner

Isiaka O. Akanbi

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Amendment*

The amendment file 16 March 2006 has been entered into this application. Claim 10 is cancelled and claims 11-20 have been added.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 3, 18 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kamon (6,245,470 B1). The reference of Kamon discloses the features of the claimed as follows:

As regard to claim 1, Kamon discloses a method of determining aberration of a projection system of a lithographic apparatus comprising of the following (fig.1)(col. 2, 24-28), projecting a reference test pattern in the lithographic apparatus (fig. 3A), projecting a second test pattern in the lithographic apparatus (fig. 3A), measuring relative displacements along the best focus position between items in resulting images of said reference test pattern and said second test pattern (col. 6, line 40-47) and determining information on the aberration of the projection system, using said measurements (col. 2, line 24-28), wherein projecting the second test pattern comprises filtering to select particular radiation paths through the projection system (col. 5, line 28-38) and wherein the measuring is performed for a plurality of images of the second test pattern obtained at planes displaced along an optical axis relative to each other (fig. 2)(fig. 3A) (col. 5, line 45-col. 6, line 1-46).

As to claims 2 and 18, according to claim 1 and 9, Kamon discloses a method calculating, for the plurality of images, a rate of change of displacement of portions of the second test pattern with respect to displacement along the optical axis (fig. 2)(figs. 3A and 3B)(col. 6, line 30-47).

As to claims 3 and 19, Kamon discloses calculating a location in a pupil of the projection system (fig. 1) traversed by the (through which) radiation for particular portions of the second test pattern (32) using the calculated rate of change of the best focus (col. 5, line 15-38)(col. 6, line 40-47).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-9, 11-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamon (6,245,470 B1) in view of Taniguchi et al. (6,304,317 B1)

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over of Kamon in view of Taniguchi, as applied to claim 1. The reference of Kamon discloses of the features of claim 4, comprising pupil filter (13), however the reference of Kamon is silent regarding wherein coordinates of a filter used for the filtering are included as variable parameters in the calculations for determining the aberration information. The reference of Taniguchi teaches of a filter used for the filtering are included as variable parameters in the calculations for determining the aberration information (col. 35, line 24-32). It would have been obvious to one having ordinary skill in the art at the time of invention to include filter used for the filtering as variable parameters in the calculations for determining the aberration information for the purpose of accurate image-forming characteristic conditions.

As to claims 5 and 13, Kamon discloses pupil filter (13), however the reference of Kamon is silent regarding wherein spherical aberration introduced by a filter used for the filtering is included as a variable parameter in determining the aberration information. The reference of Taniguchi teaches of spherical aberration introduced by a filter used (col. 12, line 52-64)(col. 18, line 23-25). It would have been obvious to one having ordinary skill in the art at the time of invention to use a filter to introduced spherical aberration for the purpose of creating controllable spherical aberration, since these are well known filter used advantages. Further, It would have

been obvious to one having ordinary skill in the art at the time of invention to include filter used for the filtering as variable parameters in the calculations for determining the aberration information for the purpose of accurate image-forming characteristic conditions.

As regard to claim 6, Kamon discloses a method of determining aberration of a projection system of a lithographic apparatus (fig.1)(col. 2, 24-28) comprising projecting a reference test pattern in the lithographic apparatus (fig. 3A), projecting a second test pattern in the lithographic apparatus (fig. 3A), measuring relative displacements along the best focus position between items in resulting images of said reference test pattern and said second test pattern (col. 6, line40-47), determining information on the aberration of the projection system, using said measurements (col. 2, line 24-28), wherein projecting the second test pattern comprises filtering to select particular radiation paths through the projection system (col. 5. line 28-38) and wherein the measuring is performed for a plurality of images of the second test pattern obtained at planes displaced along an optical axis relative to each other (fig. 3A). The reference of Kamon is silent regarding wherein coordinates of a filter used for the filtering are included as variable parameters in the calculations for determining the aberration information. The reference of Taniguchi teaches of a filter used for the filtering are included as variable parameters in the calculations for determining the aberration information (col. 35, line 2432). It would have been obvious to one having ordinary skill in the art at the time of invention to include filter used for the filtering as variable parameters in the calculations for determining the aberration information for the purpose of accurate image-forming characteristic conditions.

As regard to claim 7, Kamon discloses a method of determining aberration of a projection system of a lithographic apparatus (fig.1)(col. 2, 24-28) comprising projecting a reference test pattern in the lithographic apparatus (22/23) (fig. 3A), projecting a second test pattern (22/23) in the lithographic apparatus (fig. 3A), measuring relative displacements along the best focus position between items in resulting images of said reference test pattern and said second test pattern (col. 6, line40-47), determining information on the aberration of the projection system, using said measurements (col. 2, line 24-28), wherein projecting the second test pattern comprises filtering to select particular radiation paths through the projection system (col. 5. line 28-38) and wherein the measuring is performed for a plurality of images of the second test pattern obtained at planes displaced along an optical axis relative to each other (fig. 3A). The reference of Kamon is silent regarding wherein spherical aberration introduced by a filter used for the filtering is included as a variable parameter in determining the aberration

information. The reference of Taniguchi teaches of spherical aberration introduced by a filter used (col. 12, line 52-64)(col. 18, line 23-25). It would have been obvious to one having ordinary skill in the art at the time of invention to use a filter to introduced spherical aberration for the purpose of creating controllable spherical aberration, since these are well known filter used advantages. Further, It would have been obvious to one having ordinary skill in the art at the time of invention to include filter used for the filtering as variable parameters in the calculations for determining the aberration information for the purpose of accurate image-forming characteristic conditions.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over of Kamon in view of Taniguchi. The reference of Kamon teaches of the features of claim 9, comprising projecting a patterned beam of radiation onto a target portion of a substrate (fig.1)(col. 2, 24-28), determining an aberration of a projection system used to project the patterned beam, projecting a reference test pattern, projecting a second test pattern, the projecting of the second test pattern comprising filtering (13) to select particular radiation paths through the projection system, measuring relative displacements between items in resulting images of the reference test pattern and the second test pattern and determining information on the aberration of the projection system, using said measurements, wherein (i) the measuring is performed for a plurality of images of the second test pattern (22/23) obtained at planes displaced along an optical axis relative to each other (fig. 2)(fig. 3A) (col. 5, line 14-col. 6, line 1-46) and correcting for said aberration to reduce the aberration of the patterned beam projected onto the target portion of the substrate(col. 2, line 33-62), however the reference of Kamon is silent regarding coordinates of a filter that is used for the filtering are included as variable parameters in calculations for said determining and that spherical aberration introduced by a filter used for the filtering is included as a variable parameter in determining the aberration information. The reference of Taniguchi teaches of a filter used for the filtering are included as variable parameters in the calculations for determining the aberration information (col. 35, line 24-32) and spherical aberration introduced by a filter used (col. 12, line 52-64)(col. 18, line 23-25). It would have been obvious to one having ordinary skill in the art at the time of invention to include filter used for the filtering as variable parameters in the calculations for determining the aberration information and to use a filter to introduced spherical aberration for the purpose of creating controllable spherical aberration, since these are known filter used advantages for the purpose of accurate image-forming characteristic conditions. Additionally, It would have been

obvious to one having ordinary skill in the art at the time of invention to include filter used for the filtering as variable parameters in the calculations for determining the aberration information and to use a filter to introduced spherical aberration for the purpose of achieving a high-accuracy transfer of a (circuit) pattern.

As to claims 8, 14, 17 and 20, Kamon and Taniguchi discloses everything claimed, as applied to claim 5, 7, 9 and 13 above, the reference of Kamon is silent regarding the spherical aberration as being used to correct the measured displacements between portions of the resulting images of said reference test pattern and said second test pattern. The reference of Taniguchi teaches of spherical aberration introduced by a filter and controllable spherical aberration (col. 12, line 52-64)(col. 18, line 14-25). It would have been obvious to one having ordinary skill in the art at the time of invention to incorporate the teachings of Kamon in conjunction with Taniguchi to provide the spherical aberration that is used to correct the measured displacements between portions of the resulting images of said reference test pattern and said second test pattern for the purpose of accurate image-forming characteristic conditions.

As to claims 11 and 15, Kamon and Taniguchi discloses everything claimed, as applied to claim 6 and 7 above, in addition Kamon discloses wherein the measuring is performed for a plurality of images of the second test pattern obtained at planes displaced along an optical axis relative to each other and further comprising calculating, for the plurality of images, a rate of change of displacement of portions of the second test pattern with respect to displacement along the optical axis (figs. 1, 4,5 and 6)(col. 6, line 30-col. 7, line 1-26).

As to claims 12 and 16, Kamon and Taniguchi discloses everything claimed, as applied to claim 11 and 15 above, in addition Kamon discloses calculating a location in a pupil of the projection system (fig. 1) traversed by the (through which) radiation for particular portions of the second test pattern (32) using the calculated rate of change of the best focus (col. 5, line 15-38)(col. 6, line 40-47).

#### **Additional Prior Art**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references listed in the attached form PTO-892 teach of other prior art method of determining aberration of a projection system of a lithographic apparatus that may anticipate or obviate the claims of the applicant's invention.

### ***Response to Arguments***

Applicant's arguments/remarks, see pages 7-9, filed 16 March 2006, with respect to the rejection(s) of claim(s) 1-10 under 35 U.S.C. 102(b) and 35 U.S.C. 103(a) have been fully considered but they are not persuasive. The applicant's arguments with respect to cited references as to at least fail to disclose, teach or suggest a method of determining aberration of a projection system of a lithographic apparatus wherein, inter alia, projecting a second test pattern comprises filtering to select particular radiation paths through the projection system as recited in independent claim 1 and a device manufacturing method comprising, inter alia, projecting a second test pattern comprises filtering to select particular radiation paths through the projection system, the examiner disagrees with the applicant arguments. The reference of Kamon shows determining aberration of a projection system of a lithographic apparatus (figs. 1 and 2) and further by elimination of aberrations (col. 5, line 45-65).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

### ***Fax/Telephone Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isiaka Akanbi whose telephone number is (571) 272-8658. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on (571) 272-2059. The fax phone number



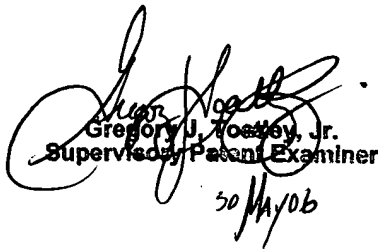
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for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Isiaka Akanbi

May 28, 2006

  
Gregory J. Tooley, Jr.  
Supervisory Patent Examiner  
50 May 06